

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
9 June 2005 (09.06.2005)

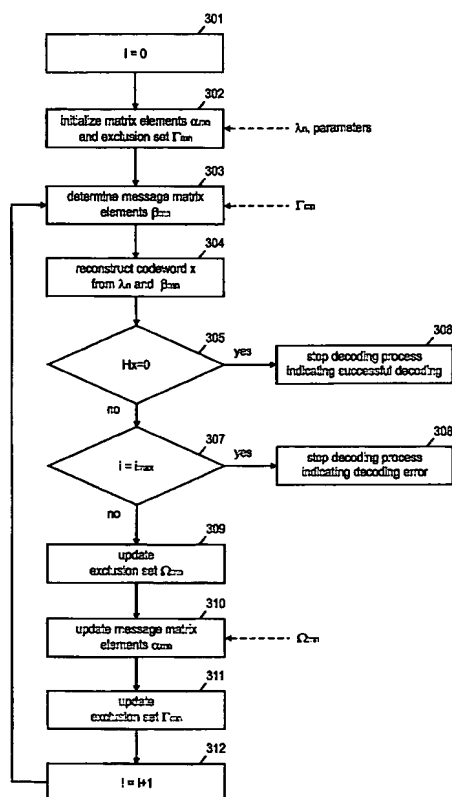
PCT

(10) International Publication Number  
**WO 2005/053164 A1**

- (51) International Patent Classification<sup>7</sup>: **H03M 13/11** (72) Inventors; and  
(75) Inventors/Applicants (for US only): **GOLITSCHKEK EDLER VON ELBWART, Alexander** [DE/DE]; Wilhelminenstrasse 32, 64285 Darmstadt (DE). **WENGERTER, Christian** [DE/DE]; Bahnhofstr. 10d, 63924 Kleinheubach (DE).
- (21) International Application Number: **PCT/EP2004/013343**
- (22) International Filing Date: **24 November 2004 (24.11.2004)** (74) Agent: **KUHL, Dietmar**; Grünecker, Kinkeldey, Stockmair & Schwanhäusser, Anwaltssozietät, Maximilianstrasse 58, 80538 München (DE).
- (25) Filing Language: **English**
- (26) Publication Language: **English** (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (30) Priority Data: **03027341.1** 26 November 2003 (26.11.2003) **EP**
- (71) Applicant (for all designated States except US): **MAT-SUSHITA ELECTRIC INDUSTRIAL CO., LTD.** [JP/JP]; Matsushita Imp Bldg. 19th Fl., 1-3-7, Shiromi, Chuo-ku, Osaka 540-6319 (JP).

[Continued on next page]

(54) Title: **BELIEF PROPAGATION DECODER CANCELLING THE EXCHANGE OF UNRELIABLE MESSAGES**



(57) Abstract: The present invention relates a method and a decoder for decoding codewords, the decoding being performed as message passing on a graph representation of the code, e.g. on low density parity-check (LDPC) code, wherein for each non-zero entry in a parity check matrix, the message matrix elements of a first message matrix are initialized with data obtained from a demodulator, and the elements of a second message matrix are determined based on message matrix elements of said first message matrix. Further, a decoded codeword is reconstructed based on the data obtained from the demodulator and the matrix elements of the second matrix. Moreover the present invention relates to and to a communication system, a mobile terminal and a base station comprising the decoder. To reduce the influence of wrong information the decoding method uses subset of matrix elements from said first/second matrix for determining a matrix element of said second/first matrix, wherein the matrix elements of said subset fulfill a reliability criterion.



**(84) Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *with international search report*